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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte YISHAI A. FELDMAN and EYAL SHNARCH

Appeal 2018-004843
Application 15/041,078[1]
Technology Center 2600

Before CARLA M. KRIVAK, HUNG H. BUI, and JON M. JURGOVAN, *Administrative Patent Judges*.

JURGOVAN, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants seek review under 35 U.S.C. § 134(a) from a Final Rejection of claims 16–33, which are all the claims pending in the application. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.[2]

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[1] Appellants identify International Business Machines Corporation of Armonk, as the real party in interest. (App. Br. 3.)

[2] Our Decision refers to the Specification ("Spec.") filed February 11, 2016, the Final Office Action ("Final Act.") mailed May 16, 2017, the Appeal Brief ("App. Br.") filed November 29, 2017, the Examiner's Answer ("Ans.") mailed February 14, 2018, and the Reply Brief ("Reply Br.") filed April 6, 2018.

CLAIMED INVENTION

The claims are directed to a computational linguistics method and system for "evaluating parse trees in linguistic analysis" (Spec. ¶ 1) (capitalization altered), to improve textual representations generated by speech-to-text engines. (Spec. ¶ 9.) Appellants' method and system improve the textual representation of a verbal communication (e.g., a spoken sentence) by ranking parse trees that model fragments within the verbal communication. (Spec. ¶¶ 9–10.) Appellants' invention ranks parse trees based on the extent to which the parse trees are matched by a combination of patterns from a semantic pattern library, the parse trees' ranking being "based on multiple criteria including both an unmatched fragment's proximity to the root of a sentence and the number of unmatched fragments [in the parse tree]." (Spec. ¶¶ 9–10, 28–29; Abstract.)

Claims 16, 22, and 28 are independent. Claim 16, reproduced below, is illustrative of the claimed subject matter:

> 16. A computer-implemented method, the computer-implemented method comprising:
>
> converting, by an application, a verbal communication into a set of parse trees, wherein:
>
> each parse tree in the set of parse trees corresponds to a different textual interpretation of the verbal communication;
>
> each parse tree in the set of parse trees includes a root node and one or more subtrees; and
>
> each subtree of the one or more subtrees corresponds to a text fragment associated with the verbal communication;
>
> receiving, by the application, a set of patterns, wherein each pattern in the set of patterns corresponds to a semantic pattern;
>
> comparing, by the application, each text fragment to each pattern in the set of patterns to yield one or more matching

patterns, wherein any text fragment that does not yield a matching pattern is an unmatched text fragment;

ranking, by the application, each parse tree in the set of parse trees, wherein each parse tree is ranked based on:

a number of branches between an unmatched text fragment and the root node in a parse tree; and

a number of the unmatched text fragments in the parse tree;

processing, by the application, the verbal communication based on an interpretation of each matching pattern from the parse tree with a highest ranking.

(App. Br. 22–27 (Claims App.).)

REJECTIONS[3] & REFERENCES

(1) Claims 16–33 stand rejected under 35 U.S.C. § 101 as directed to non-statutory subject matter. (Final Act. 6–7.)

(2) Claims 16–18, 20–24, 26–30, 32, and 33 stand rejected under 35 U.S.C. § 103 based on Fukuda et al. (US 6,618,725 B1, issued Sept. 9, 2003) ("Fukuda") and Biard et al. (US 2008/0162513 A1, published July 3, 2008) ("Biard"). (Final Act. 2–6.)

ANALYSIS

35 U.S.C. § 101 Rejection

The Examiner finds the claims are directed to "an algorithm of identifying a parse tree for processing a verbal communication," which is an abstract idea of "algorithm/mathematical relationships" and "concepts relating to organizing information (Methods of Organizing Human

[3] Claims 22–27 were rejected under 35 U.S.C. § 101 as directed to executable instructions that cover transitory "carrier waves/pulses." (Final Act. 7–8.) However, this rejection was withdrawn in the Examiner's Answer, and is no longer pending on appeal. (Ans. 8.)

Activity)." (Ans. 9–10; Final Act. 6.) The Examiner also finds the claims do not improve the functioning of the computer itself or "any other technology or technical field." (Final Act. 7.) The Examiner further finds the claims do not amount to significantly more than the abstract idea because they recite a generic computer performing "generic computer functions that are well-understood, routine, and conventional." (Final Act. 6–7.) For these reasons, the Examiner concludes the claims are directed to unpatentable subject matter under § 101. *Id.*

To determine whether subject matter is patentable under § 101, the Supreme Court has set forth a two part test "for distinguishing patents that claim laws of nature, natural phenomena, and abstract ideas from those that claim patent-eligible applications of those concepts." *Alice Corp. Pty. v. CLS Bank Int'l*, 134 S. Ct. 2347, 2355 (2014). The first step in the analysis is to "determine whether the claims at issue are directed to one of those patent-ineligible concepts," such as an abstract idea. *Id.* (citation omitted). For computer-related technologies, "the first step in the *Alice* inquiry . . . asks whether the focus of the claims is on the *specific asserted improvement* in computer capabilities" (which would be eligible subject matter) or instead "on a process that qualifies as an 'abstract idea' for which *computers are invoked merely as a tool*" (which would be ineligible subject matter). *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1335–36, 1338 (Fed. Cir. 2016) (emphasis added). "If the claims are not directed to an abstract idea [or other patent-ineligible concept], the inquiry ends. If the claims are 'directed to' an abstract idea, then the inquiry proceeds to the second step of the *Alice* framework." *McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299, 1312 (Fed. Cir. 2016).

The second step in the *Alice* framework is to consider the elements of the claims "individually and 'as an ordered combination'" to determine whether there are additional elements that "'transform the nature of the claim' into a patent-eligible application." *Alice*, 134 S. Ct. at 2355 (citing *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 78, 79 (2012)). In other words, the second step is to "search for an 'inventive concept'—*i.e.*, an element or combination of elements that is 'sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself.'" *Id.* at 2355 (citing *Mayo*, 566 U.S. at 72–73).

Because there is no single definition of an "abstract idea" under *Alice* step 1, the PTO has recently synthesized, for purposes of clarity, predictability, and consistency, key concepts identified by the courts as abstract ideas to explain that the "abstract idea" exception includes the following *three groupings*: (1) mathematical concepts; (2) mental processes; and (3) certain methods of organizing human activity, such as a fundamental economic practice and commercial interactions (including sales activities and behaviors, and business relations). *See* 2019 Revised Patent Subject Matter Eligibility Guidance, 84 Fed. Reg. 50, 52 (Jan. 7, 2019) ("PTO § 101 Memorandum"), effective January 7, 2019.

The PTO § 101 Memorandum further instructs "[c]laims that do not recite [subject] matter that falls within these enumerated groupings of abstract ideas should not be treated as reciting abstract ideas," except in rare circumstances. *See* PTO § 101 Memorandum, 84 Fed. Reg. at 53. Even if the claims recite any one of these three groupings of abstract ideas, these claims are still not "directed to" a judicial exception (abstract idea), and thus are patent-eligible under § 101, "if the claim as a whole integrates the recited

judicial exception into a practical application of that [judicial] exception." *Id.* "[I]ntegration into a practical application" requires an additional element or a combination of additional elements in the claim to apply, rely on, or use the judicial exception in a manner that imposes a meaningful limit on the judicial exception, such that the claim is more than a drafting effort designed to monopolize the exception. *See* PTO § 101 Memorandum, 84 Fed. Reg. at 53–55; *see also* MPEP 2106.05(a)–(c) and (e) (limitations indicative of "integration into a practical application") and MPEP 2106.05(f)–(h) (limitations not indicative of "integration into a practical application").

Only if a claim (1) recites a judicial exception and (2) does not integrate that exception into a practical application, do we then evaluate whether the claim provides an inventive concept. *See* PTO § 101 Memorandum, 84 Fed. Reg. at 56; *Alice*, 134 S. Ct. at 2350, 2355.

Here, the Examiner finds claims 16, 22, and 28 are directed to "an algorithm of identifying a parse tree for processing a verbal communication," which is an abstract idea of an algorithm or mathematical relationship, and a method of organizing human activity. (Ans. 9–10; Final Act. 6.) Appellants contend the claims are not directed to an abstract idea because "'[i]dentifying a parse tree' is not part of the 'body of case law precedent . . . already found to be abstract.'" (App. Br. 15.) Appellants also argue the claims are patent-eligible because the claims "are directed to an improvement in speech recognition based computer applications" and an improvement in functionality and accuracy of speech-to-text engines. (App. Br. 16; Reply Br. 4.) Appellants argue the claims improve command processing via speech-to-text software "by ranking (and thus determining), the parse tree that best matches the applications[']] semantic patterns" by

identifying unmatched fragments and their proximity to the root of a spoken sentence. (App. Br. 17; Reply Br. 3.)

We are persuaded by Appellants' arguments. Claims 16, 22, and 28 recite a method and system for converting a verbal communication (spoken utterance) into a set of parse trees, and processing the verbal communication based on the interpretation of the parse tree with a highest ranking, thereby determining a correct textual representation for the spoken utterance. We characterize these claims as describing techniques for speech recognition and pattern-based transcription enabling speech-to-text engines to interpret spoken language. Here, we are unable to determine from the Examiner's analysis whether such speech recognition techniques describe subject matter that is a mathematical concept, a method of organizing human activity, or a mental process (i.e., one of the three types of abstract ideas identified by the PTO § 101 Memorandum). We are also unable to agree that the Examiner has adequately found the claimed concept to be similar to others found to be abstract ideas by our reviewing courts.

Even if Appellants' claims were considered to recite an abstract idea, we are persuaded by Appellants' arguments that the claims *integrate* an abstract idea *into a practical application*. (App. Br. 16–18; Reply Br. 3–4.) Specifically, the claimed ranking of parse trees and processing the verbal communication based on an interpretation of each matching pattern from the parse tree with a highest ranking recite an improvement in speech-to-text applications, automated speech recognition and translation, and voice command and control. (App. Br. 16–17 (citing Spec. ¶¶ 9–10, 29); Reply Br. 3–4.) As Appellants explain, "[b]y ranking each parse tree according to these [claimed] steps, the application is able to improve processing of a verbal communication to perform an application specific function," and "the

likelihood of [the] application rejecting a sentence or producing an error message due to the sentence not being understood is minimized." (App. Br. 18.) *See McRO*, 837 F.3d at 1310, 1313, 1316 (patent eligible claims employed "rules that define output morph weight set stream as a function of phoneme sequence and time of said phoneme sequence" to allow "computers to produce 'accurate and realistic lip synchronization and facial expressions in animated characters' that previously could only be produced by human animators"); *Visual Memory LLC v. NVIDIA Corp.*, 867 F.3d 1253, 1259–60 (Fed. Cir. 2017) (patent-eligible claims were "directed to a technological improvement: an enhanced computer memory system" with "programmable operational characteristics . . . configurable based on the type of processor," and "the specification discusses the advantages offered by the technological improvement").

Because claims 16, 22, and 28 integrate the judicial exception into a practical application, we find claims 16, 22, and 28, and their dependent claims 17–21, 23–27, and 29–33, are not directed to a judicial exception (abstract idea) and are patent-eligible under § 101. For these reasons, we do not sustain the Examiner's rejection of claims 16–33 as directed to non-statutory subject matter under 35 U.S.C. § 101.

35 U.S.C. § 103 Rejection

The Examiner finds the combination of Fukuda and Biard teaches the linguistic analysis method recited in claim 16. (Final Act. 3–4.) Specifically, the Examiner finds Fukuda discloses a linguistic analysis method that converts a verbal communication into a set of parse trees, and compares each text fragment from the parse trees to semantic patterns, to determine matching patterns and text fragments that do not yield matching

patterns. (Final Act. 3 (citing Fukuda col. 2, ll. 25–33, col. 3, l. 33–col. 4, l. 15, col. 7, l. 18–col. 8, l. 7).) The Examiner also finds Biard discloses parsing trees generated from an input address, and assigning penalties to tree branches not matching address format specifications, such that "**various branches can be ranked based on their penalties to determine the best matches**." (Final Act. 4 (citing Biard ¶¶ 35–37, Abstract).) The Examiner determines it would have been obvious to the skilled artisan to rank parse trees based on branches and unmatched text fragments, as claimed, because "most penalties [in Biard] are assigned to branches of the tree of unmatched texts." (Ans. 8; Final Act. 4.) We do not agree.

We agree with Appellants that Fukuda and Biard, alone or in combination, fail to teach or suggest "ranking . . . each parse tree in the set of parse trees . . . based on: a number of branches between an unmatched text fragment and the root node in a parse tree" to determine "the parse tree with a highest ranking" as recited in claim 16. (App. Br. 19–20; Reply Br. 5–7.) Particularly, claim 16 requires *counting, for each parse tree, a number of branches* between an unmatched text fragment and the root node in the parse tree, and *comparing* parse trees against each other *based on the determined number of branches*. (Reply Br. 6–7.)

In contrast to claim 16, Biard merely discloses "potential parsed addresses are ranked based on the number of penalties," where "[p]enalties indicate deviations from exact adherence to the local address format specifications." (*See* Biard ¶ 35.) For example, Biard assigns "a penalty for having what would otherwise be a legal street type [(e.g., the word "Way")] as part of the street name [("GateWay")]," or a penalty to a unit/house number designated by a word pertaining to street types (e.g., "Way"). (*See* Biard ¶¶ 27, 35, 53.) Particularly, Biard discloses:

> [tree] parsings are scored (scoring sums up the total of the parsing penalties) and the parsings are sorted from best to worst. The best parsings have the fewest penalties, and the worst parsings have the most penalties. . . . [T]he best parsings will be used first in subsequent geocoding address database matching.

(Biard ¶¶ 31, 35.)

Thus, Biard ranks parse trees (of an address) based on matches between (i) the address's words ("text fragments"), and (ii) the permissible formats and terms for addresses of a particular geographic region. (*See* Biard ¶¶ 20 22; App. Br. 19–20.) In other words, Biard determines a correct address by checking each address word against addressing rules of a particular locale, and ranking "parse trees [for the address] . . . based on the number of penalties (i.e., the number of branches that do not include an **exact match**) assigned to a given parse tree." (App. Br. 19; *see* Biard ¶¶ 25–31, 47–55.) Thus, "the ranking system in Biard is only calculated based on the number of unmatched fragments (i.e., penalties) in the parse tree." (App. Br. 20.) Biard, however, does not determine *a number of branches between an unmatched text fragment and the root node* in the parse tree, and does not rank trees *based on a comparison between determined numbers of branches*, as claimed. Thus, "Biard does not teach or suggest ranking each parse tree based on '**a number of branches between an unmatched text fragment and the root node in a parse tree**.'" (App. Br. 19; Reply Br. 5–6.)

The Examiner has not shown that the additional teachings of Fukuda make up for the above-noted deficiencies of Biard. Fukuda does not convert a verbal communication into *multiple* parse trees, and does not rank *multiple parse trees* against each other based on a number of branches between an unmatched text fragment and the root node in a parse tree, as recited in claim

16. Rather, Fukuda converts the verbal communication into *a single* parse tree. (*See* Fukuda col. 14:32–34 ("a sentence is parsed, and a structured tree is constructed. Next, structured data is generated from the constructed structured tree data."), 14:63–64 ("a structured tree can be constructed from a sentence. This is performed on every sentence.").)

For the reasons set forth above, we do not sustain the Examiner's obviousness rejection of independent claim 16, independent claims 22 and 28 argued for substantially the same reasons as claim 16, and claims 17, 18, 20, 21, 23, 24, 26, 27, 29, 30, 32, and 33 dependent therefrom. (App. Br. 18, 20; Reply Br. 7–8.)

DECISION

The Examiner's rejection of claims 16–33 under 35 U.S.C. § 101 is reversed.

The Examiner's rejection of claims 16–18, 20–24, 26–30, 32, and 33 under 35 U.S.C. § 103 is reversed.

REVERSED